

FINAL
STREAMBED ALTERATION AGREEMENT
WITH REGARD TO
THE PACIFIC LUMBER COMPANY HABITAT CONSERVATION PLAN

By And Among

THE CALIFORNIA DEPARTMENT OF FISH AND GAME ("CDFG")

and

**THE PACIFIC LUMBER COMPANY,
SCOTIA PACIFIC COMPANY LLC AND
SALMON CREEK CORPORATION (collectively, "PALCO")**

February, 1999

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CALIFORNIA DEPARTMENT OF FISH AND GAME
Region 1
601 Locust Street
Redding, California 96001

Notification No. 99-0075

AGREEMENT REGARDING PROPOSED STREAM ALTERATION

This STREAMBED ALTERATION AGREEMENT ("Agreement") is entered into as of the Effective Date by and among the CALIFORNIA DEPARTMENT OF FISH AND GAME ("CDFG"), an agency of the State of California, and THE PACIFIC LUMBER COMPANY, SCOTIA PACIFIC COMPANY LLC and SALMON CREEK CORPORATION (collectively, "PALCO").

These entities may be referred to collectively as "Parties" and each individually as a "Party."

Recitals and Purposes

- A. PALCO owns approximately 211,000 acres within Humboldt County, California (the "PALCO Lands"). PALCO is in the process of acquiring and is planning to acquire certain additional lands near or adjacent to the PALCO Lands (the "Additional Lands"; the PALCO Lands and Additional Lands are referred to collectively herein as the "Covered Lands"). The Covered Lands fall within several major watersheds in Humboldt County, California. Certain portions of these watersheds form the Plan Area for this Agreement (the "Plan Area" is set forth in Exhibit "A" of the Implementation Agreement, to which this Agreement is attached as Exhibit "B").
- B. CDFG has jurisdiction over the conservation, protection, restoration, enhancement, and management of fish, wildlife, native plants, and habitat necessary for biologically sustainable populations of those species under State law including, but not limited to, California Fish and Game Code section 1600 *et seq.*
- C. PALCO notified DFG on or about October 29, 1998, concurrent with its application for an incidental take permit under Fish and Game Code section 2081(b) and submittal of a habitat conservation plan and sustained yield plan, which describes the activities PALCO desires to conduct on the Covered Lands, that it wanted a Streambed Alteration Agreement for such activities. PALCO desires to use

the Covered Lands for certain activities, including all activities relating to timber production and harvesting, gravel mining, road construction and maintenance, grazing, stream enhancement projects, fish rearing operations, and the Operating Conservation Program activities as particularly described at Volume I, Part A, of PALCO's Habitat Conservation Plan/Sustained Yield Plan (the "HCP"), which was prepared by PALCO. The HCP, dated February 1999, as approved by CDFG, the United States Fish and Wildlife Service ("USFWS") and the National Marine Fisheries Service ("NMFS"), in relation to issuance of incidental take permits by CDFG (the "State Permit") under the California Endangered Species Act, and USFWS and NMFS (collectively "Federal Permits") under the federal Endangered Species Act, is referred to as the approved HCP. The State and Federal Permits cover certain of PALCO's desired activities, including activities relating to timber production and harvesting, road construction and maintenance, and Operating Conservation Program activities ("Covered Activities").

- D. The Parties, USFWS, NMFS, and the California Department of Forestry and Fire Protection, have entered into that certain Implementation Agreement dated the Effective Date (to which this Agreement is attached as Exhibit "B"), which implements the approved HCP, into which this Streambed Alteration Agreement is incorporated as part of the HCP's Operating Conservation Program.
- E. CDFG has determined that certain of the Covered Activities may substantially divert or obstruct the natural flow of or substantially change the bed, channel, or bank of any river, stream, or lake, or use any material from the streambeds on the Covered Lands depending on the location and/or impacts of the Covered Activities. These Covered Activities are listed on Exhibit "A" hereto.
- F. CDFG has determined that of those Covered Activities listed on Exhibit "A", specific Covered Activities appropriately may be the subject of a five-year Streambed Alteration Agreement. These specific Covered Activities are listed on Exhibit "B" hereto. Those Covered Activities not listed on Exhibit "B" would be addressed under separate notifications and agreements pursuant to the provisions of California Fish and Game Code Section 1603.
- G. CDFG has determined that specific measures, in addition to those provided pursuant to the HCP, are necessary to protect fish and wildlife resources from possible substantial adverse effects of the specific Covered Activities listed on Exhibit "B" hereto. These specific measures are identified on Exhibit "C" hereto.

- H. PALCO and CDFG acknowledge that this Agreement is entered into with the understanding that its terms may be amended as directed over time by the results of on-going monitoring activities, changed conditions, and new information. The measures for protection of fish and wildlife resources from impacts of the specific activities subject to this Agreement will be evaluated in light of monitoring results and other new information. Such evaluations shall be used to adapt the measures to better achieve the Agreement's objective to protect fish and wildlife resources.

Agreement

This Agreement is a Streambed Alteration Agreement by and between CDFG and PALCO pursuant to section 1603 of the California Fish and Game Code. PALCO may lawfully conduct the specific Covered Activities identified on Exhibit "B" that may substantially divert or obstruct the natural flow or substantially change the bed, channel, or bank of any river, stream or lake, or use any materials from the streambeds on the Covered Lands pursuant to this Agreement if the specific applicable measures identified on Exhibit "C" hereto are incorporated into these specific Covered Activities in addition to the other conservation and management measures required pursuant to the approved HCP, including the Aquatics Conservation Plan.

PALCO hereby agrees to incorporate into the Covered Activities identified on Exhibit "B" hereto the specific applicable measures identified on Exhibit "C" hereto in accordance with the following provisions. Where PALCO determines that conformance with any of the applicable measures identified on Exhibit "C" hereto is not feasible, PALCO may propose alternative measures through a separate notification and agreement pursuant to California Fish and Game Code Section 1603.

PALCO further agrees that the authority given to PALCO under this Agreement applies to all of PALCO's officers, directors, employees, agents, subsidiaries, contractors, and subcontractors, and their officers, directors, employees and agents. Such persons and entities shall be deemed under the direct control of, and acting as agents of PALCO. PALCO shall conduct an educational program, approved by CDFG, USFWS, and NMFS, to fully inform all such persons and entities of the terms and conditions of the approved HCP's Operating Conservation Program, including this Agreement, and shall be responsible for supervising their compliance with the terms and conditions herein. All contracts between PALCO and such persons and entities shall require their compliance with this Agreement. Solely for the purposes of this Agreement, each PALCO entity shall remain legally responsible for the Covered Activities subject to this Agreement of each such person or entity. Further, in the event any PALCO entity ("acting entity") takes any action on land or with respect to timber owned by another PALCO entity ("landowning entity"), as to such action the acting entity, for all purposes connected with this Agreement and liability arising thereunder where the acting entity

is acting pursuant to an oral or written contract or with the consent of the landowning entity, shall be deemed to be acting as the agent of the landowning entity and to be acting within the course and scope of such agency. For purposes of this provision, action includes failure to act. PALCO shall provide a copy of this Agreement to all such persons and entities performing or supervising Covered Activities subject to this Agreement. Copies of this Agreement shall be readily available at work sites at all times during periods of active work and must be presented to any CDFG personnel.

The Parties agree that the Covered Activities listed on Exhibit "A", other than those listed on Exhibit "B", may require separate notification and agreement pursuant to California Fish and Game Code Section 1603.

1.0 Notification for Authorization to Proceed with Covered Activities

At least 14 calendar days prior to commencing any of the specific Covered Activities identified on Exhibit "B" hereto except road storm-proofing and road maintenance, PALCO shall notify CDFG in writing of its intent to commence such Covered Activity (the "Notification"). For road storm-proofing and road maintenance, PALCO shall give at least three (3) calendar days prior notification in writing of intent to commence such activities.

The Notification will enable CDFG to determine whether or not such Covered Activity is subject to this Agreement, and if so, to enable CDFG to ensure that the applicable measures set forth in Exhibit "C" are incorporated into the activity.

1.1 Presumption

CDFG will presume that the Covered Activity of which it was notified pursuant to the foregoing procedures is subject to this Agreement. Therefore, unless CDFG determines and notifies PALCO within 14 calendar days of the date of Notification that the activity (other than road storm-proofing and road maintenance) is not permitted pursuant to this Agreement, PALCO may commence such activity in accordance with the terms of this Agreement 14 calendar days after notifying CDFG thereof. Unless CDFG determines and notifies PALCO within three (3) calendar days of the date of Notification that road storm-proofing or road maintenance is not permitted pursuant to this Agreement, PALCO may commence such activity in accordance with the terms of this Agreement three (3) calendar days after notifying CDFG thereof.

If CDFG determines that the Covered Activity of which it was notified is not subject to this Agreement, PALCO shall not proceed with the Covered Activity except pursuant to a separate agreement under Section

1603 of the California Fish and Game Code, or unless and until the CDFG determines after any dispute resolution pursuant to Section 9.2 of the Implementation Agreement that the Covered Activity is subject to this Agreement.

1.1.1 Effect of Presumption

Notwithstanding the foregoing, this presumption shall not preclude CDFG from taking any appropriate enforcement actions for any violation of the California Fish and Game Code, and any violations of this Agreement.

1.2 Content of Notification

Notification shall consist of the following and shall be deemed received by CDFG upon receipt of all of the following:

- (1) A description of the Covered Activity, including work plans describing the type and scope of the work planned, including the applicable Timber Harvesting Plan (THP) number, if available. If necessary to determining which measures set forth in Exhibit "C" apply to the Covered Activity for which notification is given, the description shall also specify whether the activity will be done on a Class I, II, or III watercourse, or a Class II restorable fish-bearing watercourse. For purposes of this Agreement, the terms Class I, Class II, and Class III shall be defined pursuant to the California Forest Practice Rules. For purposes of this Agreement, a Class II watercourse may be deemed restorable fish-bearing pursuant to the THP process. For activities that are not part of a THP process, a watercourse shall be deemed restorable fish-bearing by CDFG in consultation with PALCO. In such case, PALCO shall request a pre-notification consultation for purposes of CDFG's making such determination;
- (2) The commencement and termination dates;
- (3) A map of the work site with sufficient detail to enable a person who is not familiar with the area to easily locate the site;
- (4) Identification of the applicable set of measures listed on Exhibit "C" hereto that will be applied to the Covered Activity;

- (5) If the activity requires any authorization, permit, or entitlement from any federal, state or local agency, a copy of such authorization, permit, or other entitlement; and
- (6) A fee in the amount of \$161.00 in accordance with Section 4.0 of this Agreement.

2.0 Term of the Agreement and Automatic Renewal

This Agreement shall be valid for a period of five years from the Effective Date, provided the State Permit remains in effect for such period. This Agreement shall renew automatically at the expiration of the term of this Agreement, conditioned upon receipt by CDFG of the renewal fee, which shall be submitted to CDFG at least five (5) days prior to the expiration of the term of this Agreement, provided that PALCO remains in compliance with the terms of this Agreement, the State Permit, the HCP, and the Implementation Agreement, and except as provided in Section 2.1 of this Agreement. Each such renewal shall be valid for the maximum period allowable under law at the time of the renewal (which, as of the Effective Date, is five years), provided that the State Permit remains in effect for such period.

2.1 No Automatic Renewal if Determination of Substantial Change in Conditions

Notwithstanding the foregoing paragraph, in accordance with California Fish and Game Code section 1603(g), if the CDFG determines that there has been a substantial change in conditions, the Agreement will not automatically renew. CDFG shall make such determination and shall notify PALCO thereof prior to the expiration of the term of the Agreement. If PALCO objects to CDFG's determination, the dispute shall be resolved pursuant to the arbitration provisions set forth in section 1603(b) of the California Fish and Game Code.

3.0 Suspension, Cancellation, Reinstatement, and Reconsideration

3.1 Suspension and Cancellation

Except as otherwise provided by law, this Agreement, or any other Agreement, CDFG may suspend or cancel this Agreement only pursuant to the following administrative process. Any action to suspend or cancel any privileges under the Agreement shall be

limited so as to address the discrete action or inaction that has resulted in the suspension or cancellation, to the extent consistent with the fish and wildlife resource protection purposes of the Agreement. As such, suspension or cancellation may apply only to the specified Covered Activity or Covered Lands. PALCO shall be notified in writing of any proposed suspension or cancellation. Such notice shall identify the reason(s) for such suspension or cancellation, the actions necessary to correct the deficiencies, inform PALCO of the right to object to the proposed suspension or cancellation. Such notice may be amended at any time by CDFG. PALCO may file a written objection to the proposed action within 45 calendar days of the date of CDFG's notice. A decision on the proposed suspension or cancellation shall be made within 45 days after the end of the objection period. CDFG shall notify PALCO in writing of the Regional Manager's decision and the reasons therefor. The Regional Manager may begin procedures to cancel the Agreement if PALCO fails within 60 days of written notification of the Regional Manager's decision to suspend the Agreement to correct the deficiencies that were the cause of the suspension, or if statutory enactments subsequent to the execution or renewal of the Agreement prohibit the continuation of the Agreement or a Covered Activity subject to this Agreement.

Notwithstanding the foregoing, in accordance with Section 8.3 of the Implementation Agreement, suspension or revocation of the State Permit or Covered Activities under the State Permit may constitute suspension or cancellation of this Agreement or specified Covered Species, Covered Lands or Covered Activities subject to the Agreement, as applicable.

Notwithstanding suspension and/or cancellation of any privileges under this Agreement, PALCO shall remain obligated to mitigate for the adverse effects that occurred from the actions resulting in suspension or cancellation by properly performing such actions to correct the deficiencies as set forth in CDFG notification to PALCO of proposed suspension or cancellation and the applicable conservation and management measures identified in Exhibit "C" hereto.

3.1.1 Reinstatement After Suspension

If PALCO corrects the deficiencies that were the cause of suspension within 60 days of written notification of the Regional Manager's decision to suspend the Agreement, the Agreement will be reinstated.

3.1.2 Reconsideration of Suspension or Cancellation

PALCO may request reconsideration of a suspension or cancellation of this Agreement. The request for reconsideration must be received by the Regional Manager within 30 days of the date of notification of the decision for which reconsideration is requested. CDFG shall notify PALCO of its decision in writing within 45 days of the receipt of the request for reconsideration. Such decision may be appealed to the Director within 30 days of the date of notification of the decision on the request for reconsideration. The Director's decision on appeal shall be made within 30 calendar days of receipt of the appeal, unless such time is extended for one additional 30-day period for good cause and PALCO is notified of the extension. The Director's decision on appeal shall constitute the final administrative decision of CDFG.

4.0 Fees

Notwithstanding the Section 699.5 of Title 14 of the California Code of Regulations, PALCO shall pay a fee of \$2,400.00 prior to the execution of this Agreement in order to pay the costs of the CDFG in preparing this Agreement. Thereafter, PALCO shall submit with each notification submitted pursuant to this Agreement, a fee of \$161.00 to CDFG in order to pay the costs of the CDFG in administering and enforcing this Agreement. The fee for renewal of this Agreement for another five (5) year term shall be \$2,400.00 in order to pay the costs of CDFG in reevaluating the Agreement. These fees may be adjusted, as necessary, for inflation.

5.0 Compliance with Other Laws

Nothing in this Agreement shall be construed to authorize the violation of any applicable federal, state, or local laws including, but not limited to, California Fish and Game Code Section 5650, the Porter-Cologne Act, and the Forest Practice Rules.

6.0 Incorporation of the Implementation Agreement


The Parties agree that except as otherwise specifically provided herein, the Implementation Agreement including, without limitation, the definitions and the following sections shall govern this Streambed Alteration Agreement: 3.3 funding, 3.4 monitoring and reporting, 8.4 relinquishment, 8.5 full mitigation, 7.2.2 amendment, 9.0 remedies, enforcement and dispute resolution, and 10.0 miscellaneous.

IN WITNESS WHEREOF, THE PARTIES HERETO have executed this Agreement to be in effect as of the Effective Date, which shall be the date following execution of this Agreement by all Parties. The Agreement shall take effect on the later of March 1, 1999, or the date the Agreement is delivered to PALCO pursuant to the "Headwaters Escrow Instructions" (Escrow No.206816 of Fidelity National Title Company of 404 H Street, Eureka, California 95501); provided that if the Agreement does not take effect on March 1, 1999, the Agreement may be rescinded prior to the Effective Date upon the mutual agreement of PALCO and CDFG or by CDFG after a reasonable period of time and after advance written notice to PALCO.

Dated: 3. 1. 99.

THE PACIFIC LUMBER COMPANY

By:


John Campbell
President and Chief Executive Officer

Dated: 3. 1. 99.


SCOTIA PACIFIC COMPANY LLC

By:


John Campbell
President and Chief Executive Officer

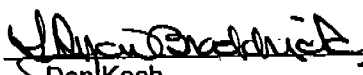
Dated: 3.1.99.

SALMON CREEK CORPORATION

By: 
John Campbell
President and Chief Executive Officer

Dated: 2/26/99

CALIFORNIA DEPARTMENT OF FISH AND GAME

By:  CHIEF DEPT. AGRICULTURE
for Don Koch
Regional Manager

APPROVED AS TO FORM:

Dated: 2/26/99

GENERAL COUNSEL
California Department of Fish and Game


By: 
Ann S. Malcolm
Acting General Counsel

EXHIBIT A

Covered Activities Subject to California Fish and Game Code Section 1603

The following Covered Activities may be subject to California Fish and Game Code Section 1603 depending on the location and/or the impacts of such activities:

1. Timber Management Activities, including
 - (a) timber harvest;
 - (b) site preparation;
 - (c) planting;
 - (d) vegetation management;
 - (e) thinning;
 - (f) fire suppression.
2. Road Construction/Reconstruction (including permanent and temporary crossings and fords), Maintenance and Closure;
3. Water Drafting;
4. Rock Quarrying and Borrow Pit Extraction;
5. Scientific Surveys and Studies; and
6. Operating Conservation Program Activities.
 - (a) road storm-proofing
 - (b) implementation and effectiveness monitoring

EXHIBIT B

Specific Covered Activities Covered Under the Streambed Alteration Agreement

The following specific Covered Activities are subject to this Streambed Alteration Agreement:

1. Permanent Road Crossings (Class I and Class II Restorable Fish-bearing Watercourses);
2. Permanent Culvert Road Crossings (Class II and III Watercourses);
3. Temporary Road Crossings (Class I and Class II Restorable Fish-bearing Watercourses);
4. Other Temporary Crossings (Non-Class I Watercourses);
5. Fords (All Watercourses);
6. Water Drafting;
7. Road Construction/Reconstruction involving permanent and temporary crossings and fords;
and
8. Operating Conservation Program Activities
 - (a) road storm-proofing involving permanent and temporary crossings and fords.

EXHIBIT C

Measures Necessary for Protection of Fish and Wildlife Resources from Impacts of Specific Covered Activities Subject to This Streambed Alteration Agreement

I. PERMANENT ROAD CROSSINGS (Class I Watercourses and Class II Watercourses That Are Deemed Restorable Fish-Bearing)

1. Any structure or culvert placed within a Class I watercourses and restorable fish-bearing streams shall be designed, constructed and maintained such that it does not constitute a barrier to upstream or downstream movement of fish. An acceptable alignment or construction would include but is not limited to the supply of water at a depth, and velocity to allow for unimpeded upstream and downstream fish movement.
2. Bridges are the preferred crossing type for Class I watercourses and restorable fish-bearing streams. Where bridges are used, PALCO shall construct clear span bridges without abutment fills below the ordinary high water mark across such streams. Bridges shall also be set at a high enough level to pass the entire 100-year peak flows and floating debris to the extent feasible. Log stringer bridges may be used, but all surfacing material shall be clean rock if the surfacing material is not otherwise planked, plated or paved. Structural arch culverts may also be used under these same conditions. If not feasible, all bridge construction and abutment materials shall be logs and clean (screened and washed) fill. For purposes of this Agreement, any bridge that spans 30 feet is feasible.
3. Permanent culverts on fish-bearing streams shall be sized to accommodate 100-year peak flows and to avoid peak flows crossing over the crossings. Size shall be calculated by using at least two methods including the Talbert method and any method identified in Weaver and Hagans (1994). Culverts shall be aligned with the stream channel and installed below stream grade. Culverts shall extend beyond road fill. Culvert fills shall be made failsoft per Weave and Hagans (1994).
4. Crossings (bridges or culverts) shall be installed, replaced or repaired when fish are not present, but not sooner than June 15 and not after October 15.
5. All bare mineral soil exposed in conjunction with crossing construction, maintenance, repair or removal shall be treated for erosion immediately upon completion of work on the crossing. One hundred percent of bare mineral soil, except within the streambed, shall be treated immediately upon completion of work with 4" straw mulch and 100 lbs/acre equivalent barley seed.
6. Culvert inlets and outlets shall be protected from erosion as appropriate through armoring constructed of graded and backed rock riprap or other non-erodible material (e.g., concrete head wall). Where used, riprap shall be constructed to remain in place during 100-year peak flows, extend at least as high as the top of the pipe and on inlets, and shall extend sufficient distance upstream as "wing walls" to prevent bank erosion. Where armoring is used, outfall of culverts shall be riprapped in a U-shaped channel, with clean material of

sufficient size to remain in place during 100-year peak flow events. Rip rap in the channel below the culvert shall be set below grade so as to allow the natural accumulation of bedload at stream grade.

7. No culvert or bridge is to be located on the curve of a stream, where the radius of curvature is less than or equal to the stream width if a feasible alternative is available.
8. To facilitate adult salmonid migration, the following measures shall be implemented when designing and constructing new or replacement culverts on Class I fish-bearing streams. CDFG recognizes that certain of these measures conflict with other measures in significant ways. For example, the use of culverts large enough to pass 100-year flows frequently may be inconsistent with maintaining a minimum water depth of 1 foot at median flow. CDFG also recognizes that climatic conditions (e.g., drought) and water course size may affect PALCO's ability to comply with certain measures. Regardless, PALCO shall endeavor to achieve compliance with the measures to have the least impact on fish and wildlife resources. These measures shall be reviewed at least every five years by the CDFG and modified as necessary to reflect the best available information on fish passage. These measures pertain primarily to streams which support salmonids.

In addition, streams on PALCO's ownership may support populations of non-salmonid fishes, amphibians and other aquatic organisms, some of which could become listed during the life of the Habitat Conservation Plan. It is, therefore, imperative that PALCO and its agent or contractor responsible for construction, reconstruction and maintenance of crossings on such streams shall be aware of those species present in the effected streams and shall apply culvert specifications commensurate with their biological needs, as appropriate. Such information can be obtained from the CDFG, NMFS and USFWS.

- a. Fish passage shall be provided during at least 90% of the adult migration period to the extent feasible. The migration period for salmon and steelhead is assumed to be a six month period, generally October through March. The "flow duration method" may be used to approximate the 90% peak passage flow for a six month period, i.e., the 95 percentile for on an annual basis or other method approved by CDFG.
- b. At high flows, water velocity and distance between resting pools limit upstream fish passage. The "Alaskan Curve" (attached as Exhibit "D") , or alternative methods acceptable to CDFG shall be used to determine the maximum acceptable velocity through the culvert at the 95 percentile flow.
- c. At low flows, water depth in a culvert limits fish passage. A minimum depth of one foot shall be required at the median flow to the extent feasible. Median flow shall be established at the 50 percentile flow.
- d. Culverts shall be installed at 0.5% slope, or less.
- e. Culverts shall be installed with the bottom 1/4 diameter below streambed level. Multiple barrel crossings shall not be used.

- f. Baffles and weirs shall not be used.
- g. Designs which result in the following shall not be permitted:
 - (i) Velocity of 12 feet per second at any point, except during floods;
 - (ii) Sudden changes in velocity causing a barrier to fish passage;
 - (iii) Turbulent flow causing a barrier to fish passage;
 - (iv) Changes in culvert alignment;
 - (v) Debris catchers within culvert;
 - (vi) Drop inlet culverts; and
 - (vii) Perched culvert outlets.
- 9. PALCO shall inspect culverts annually for risk of failure and migration barriers through corrosion, rust or abrasion. Culverts with perforations or separation shall be repaired or replaced between June 15 and October 15. If the repair consists of an insert into a culvert, the repaired culvert shall have an invert roughness comparable to that which existed prior to the repair.
- 10. Permanent culverts and bridges shall be maintained and kept open year round. PALCO is responsible for such maintenance as long as the culvert remains in the stream.
- 11. The disturbance or removal of vegetation shall not exceed the minimum necessary to complete the operations as described. The channel and bank configuration of the disturbed areas at any crossing shall be restored to as near its original condition as possible. One hundred percent of bare mineral soil, except within the streambed, shall be treated immediately upon completion of work with 4" straw mulch and 100 lbs/acre equivalent barley seed.
- 12. If operations require moving of equipment across a flowing stream, such operations shall be conducted without causing a prolonged visible increase in stream turbidity. For repeated crossings, the operator shall install a bridge, culvert, or rock-lined crossing as described. Equipment may be operated in the stream channel of flowing streams only as may be necessary to construct crossings, barriers, fills, or channel changes or during the use of fords. During construction of crossings, if prolonged turbidity may be transported downstream, the flow shall be diverted around the work area by a temporary pipe, diversion channel or pumping, and sediment check dams constructed of screened, washed gravel will be installed downstream to control the turbidity.
- 13. Structures and associated materials that are not designed to withstand high seasonal flows shall be removed to areas above the high water mark before such flows occur.
- 14. If the stream channel has been altered during the operations, its low flow channel shall be

returned as nearly as possible to its natural state. The shape and gradient of the streambed shall be as nearly as possible the same gradient as that which existed prior to the disturbance.

15. Any temporary dam or artificial obstruction required in constructing a permanent road crossing shall only be built from materials such as clean (screened and washed) gravel or other means that will avoid siltation.

II. PERMANENT CULVERT ROAD CROSSINGS (Class II and III Watercourses)

1. Permanent culverts shall have pipes sized to provide 50 year peak flow passage, calculated by using at least two of the methods including the Talbert Method and any method identified in Weaver and Hagans (1994). Culverts shall be aligned with the stream channel. Culverts shall be placed at stream gradient, or have downspouts, or have energy dissipaters at outfall to prevent erosion. Culverts shall be long enough so that roadfill does not extend or slough past the culvert ends.
2. The inlet of the culvert shall be protected as appropriate through armoring constructed of rock riprap, gabions, concrete, or other non-erodible material. Where used, riprap shall be constructed to remain in place during 50-year peak stream flows, and extend at least as high as the top of the pipe and extended a short distance upstream as "wing walls" if necessary to prevent erosion of the banks. Outlet of culverts shall be riprapped if roadfill sloughing into channel can occur. Where armoring is used, outfall riprapping shall be sufficient to protect the roadfill from erosion and will consist of clean material of sufficient size to remain in place during high flow velocities.
3. If half-round downspouts (flume) are used, they shall be of sufficient size to accommodate entire anticipated flow from the attached culvert. Downspouts shall be securely attached to the culvert, and anchored to the fill slope using deadman posts or cable-anchor assemblies to operate through the life of the crossing.
4. On culverted streams which carry a debris load that could endanger the crossing, a trash/debris catchment structure shall be constructed above the crossing. The design of the trashrack shall be of sufficient strength to withstand high flows, and shall be cleaned or maintained on an annual basis and as necessary to prevent fill scour or overtopping of the crossing.
5. Multiple-pipe culvert crossings shall not be used, except where necessary to maintain an existing roadgrade. Where multiple pipes are used, they shall be offset so that low flows utilize only one pipe.
6. The disturbance or removal of vegetation shall not exceed the minimum necessary to complete the operations as described. The channel and bank configuration of the disturbed areas at any crossing shall be restored to as near its original condition as possible. One hundred percent of bare mineral soil, except within the streambed, shall be treated immediately upon completion of work with 4" straw mulch and 100 lbs/acre equivalent barley seed.

7. If operations require moving of equipment across a flowing stream, such operations shall be conducted without causing a prolonged visible increase in stream turbidity. For repeated crossings, the operator shall install a bridge, culvert, or rock-lined crossing as described. Equipment may be operated in the stream channel of flowing streams only as may be necessary to construct crossings, barriers, fills, or channel changes or during the use of fords. During construction of crossings, if prolonged turbidity may be transported downstream, the flow shall be diverted around the work area by a temporary pipe, diversion channel or pumping, and sediment check dams constructed of screened, washed gravel will be installed downstream to control the turbidity.
8. Structures and associated materials that are not designed to withstand high seasonal flows shall be removed to areas above the high water mark before such flows occur.
9. If the stream channel has been altered during the operations, its low flow channel shall be returned as nearly as possible to its natural state. The shape and gradient of the streambed shall be as nearly as possible the same gradient as that which existed prior to the disturbance.
10. When any dam or artificial obstruction is being constructed, maintained, or placed in operation, sufficient water shall at all times be allowed to pass downstream to maintain fish life below the work area. An adequate fish passage facility must be incorporated into any barrier that obstructs fish passage. Any temporary dam or artificial obstruction shall only be built from materials such as clean (washed and screened) gravel or other means that will avoid siltation.
11. No culverts shall be made of plastic shall be used on Class I watercourses, or perennially flowing Class II watercourses, or installations where connections are required.

III. TEMPORARY ROAD CROSSINGS (Class I Watercourses and Class II Restorable Fish-Bearing Watercourses)

1. Temporary crossings on Class I watercourses and Class II restorable fish-bearing watercourses include bridges, fords and culverts. Fill materials shall include screened washed river run gravel or logs (Humboldt) or both. Materials used as fill materials shall cause no siltation.
2. Temporary crossings (bridges, culverts and fordings) shall be installed, replaced or repaired when fish are not present, but not sooner than June 15 and not after October 15. Bridges and culverts and all top fill materials used for road surfacing at temporary crossings shall be removed and stream channels and banks returned to pre-project condition by October 15. Habitat structures and elements (including pools, riffles, large woody debris and boulders) removed for crossing installation shall be restored to their preconstruction configurations.
3. All bare mineral soil exposed in conjunction with crossing construction, maintenance, repair or removal shall be treated to prevent erosion immediately upon completion of work on the crossing. One hundred percent of bare mineral soil, except within the streambed, shall be treated immediately upon completion of work with straw mulch, jute netting, hydroseeding,

or other method identified in Weaver and Hagans (1994).

4. Any structure or culvert placed within a Class I watercourse or Class II restorable fish-bearing watercourse shall be designed, constructed and maintained such that it does not constitute a barrier to upstream or downstream movement of fish. An acceptable design or construction shall include but shall not be limited to providing the supply of water to allow upstream and downstream fish migration.
5. At low flows, water depth in a culvert limits fish passage. A minimum depth of one foot shall be required at the median flow to the extent feasible. Median flow shall be established at the 50 percentile flow.
6. Culverts shall be installed at 0.5% slope, or less.
7. Bottoms of temporary culverts shall be placed at or below stream channel grade.
8. Multiple-barrel crossings shall not be used, except where necessary to maintain an existing roadgrade. Where multiple pipes are used, they shall be offset so that low flows utilize only one pipe.
9. The disturbance or removal of vegetation shall not exceed the minimum necessary to complete the operations as described. The channel and bank configuration of the disturbed areas at any crossing shall be restored to as near its original condition as possible. One hundred percent of bare mineral soil shall be treated with straw mulch or other erosion control materials immediately upon completion of work.
10. If operations require moving of equipment across a flowing stream, such operations shall be conducted without causing a prolonged visible increase in stream turbidity. For repeated crossings, the operator shall install a bridge, culvert, or rock-lined crossing as described. Equipment may be operated in the stream channel of flowing streams only as may be necessary to construct crossings, barriers, fills, or channel changes or during the use of fords. During construction of crossings, if prolonged turbidity may be transported downstream, the flow shall be diverted around the work area by a temporary pipe, diversion channel or pumping, and sediment check dams constructed of screened, washed gravel will be installed downstream to control the turbidity.
11. Structures and associated materials that are not designed to withstand high seasonal flows shall be removed to areas above the high water mark before such flows occur.
12. If the stream channel has been altered during the operations, its low flow channel shall be returned as nearly as possible to its natural state. The shape and gradient of the streambed shall be as nearly as possible the same gradient as that which existed prior to the disturbance.
13. When any dam or artificial obstruction is being constructed, maintained, or placed in operation, sufficient water shall at all times be allowed to pass downstream to maintain fish life below the work area. An adequate fish passage facility must be incorporated into any barrier that obstructs fish passage. Any temporary dam or artificial obstruction shall only

be built from materials such as clean (washed and screened) gravel or other means that will avoid siltation.

IV. OTHER TEMPORARY CROSSINGS (Non-Class I Water Courses)

1. Temporary crossings include bridges, fords, culverts with local fill, culverts with imported rock fill, and crossings with log fill (Humboldt), and combinations of all three types of crossings. Temporary crossings and all fill materials shall be removed prior to October 15 or when threatened by rising flows. Temporary crossings constructed prior to June 1 shall be sized following the specifications for permanent culvert road crossings.
2. When fill material used in the crossing is removed, channel shape and gradient shall be returned to pre-project condition to the extent feasible. Habitat structures removed during temporary crossing installation shall be restored or replaced in equal quantities after removing the crossing.
3. Culverts with rock or log-fill shall be used when it may be difficult to remove all fill material from the channel, such as deep, incised, steep, or rough channel bottoms, or when flows would transport sediment downstream. Pipe shall be sufficient size to accommodate the expected flow during the use period. Rock fill shall be free of all earthen material. Log fill crossing (Humboldt) shall be constructed by laying choker cables or similar cables across stream channel, then placing pipe and/or sound logs in the channel bottom. The logs shall then be covered with filter fabric and straw mats or rock, with a local topfill for road surfacing. Prior to October 15, the topfill shall be scraped off and the logs shall be removed as a unit by pulling the chokers and loose soil shall be removed from the crossing site using mechanized equipment and/or hand tools, as necessary.
4. Temporary bridges can be flatcars, log stringers, plate, or other designs, which shall be removed by the end of the work period in each year. Fills for abutments below high water mark shall be log and/or rock. Log stringer bridges shall be surfaced with filter fabric or straw, under a road surface layer of rock, to prevent surface material from entering channel during use.
5. The disturbance or removal of vegetation shall not exceed the minimum necessary to complete the operations as described. The channel and bank configuration of the disturbed areas at any crossing shall be restored to as near its original condition as possible. One hundred percent of bare mineral soil, except within the streambed, shall be treated immediately upon completion of work with 4" straw mulch and 100 lbs/acre equivalent barley seed.
6. If operations require moving of equipment across a flowing stream, such operations shall be conducted without causing a prolonged visible increase in stream turbidity. For repeated crossings, the operator shall install a bridge, culvert, or rock-lined crossing as described. Equipment may be operated in the stream channel of flowing streams only as may be necessary to construct crossings, barriers, fills, or channel changes or during the use of fords. During construction of crossings, if prolonged turbidity may be transported downstream, the flow shall be diverted around the work area by a temporary pipe, diversion channel or pumping, and sediment check dams constructed of screened, washed gravel

will be installed downstream to control the turbidity.

7. Structures and associated materials that are not designed to withstand high seasonal flows shall be removed to areas above the high water mark before such flows occur.
8. If the stream channel has been altered during the operations, its low flow channel shall be returned as nearly as possible to its natural state. The shape and gradient of the streambed shall be as nearly as possible the same gradient as that which existed prior to the disturbance.
9. Any temporary dam or artificial obstruction required in constructing a temporary road crossing shall only be built from materials such as clean (screened and washed) gravel or other means that will avoid siltation.

V. FORDS (All Watercourses)

1. Fords shall be constructed using rock that shall withstand erosion by expected flow velocities, placed in a U-shaped channel to create a driveable crossing that maintains all surface flow and prevents stream flow from seiving through the crossing. If use of the ford by heavy traffic would result in significant downstream transport of sediment, a temporary crossing shall be installed.
2. Concrete fords are not to be constructed.
3. No native soil may be pushed into the stream high flow channel, and if stream habitat structures are removed, they shall be restored or replaced in equal quantities after removing the crossing.
4. The disturbance or removal of vegetation shall not exceed the minimum necessary to complete the operations as described. The channel and bank configurations of the disturbed areas of any crossing shall be restored to as near its original condition as possible. One hundred percent of bare mineral soil shall be treated with 4" straw mulch and 100 lbs/acre equivalent barley seed.
5. Except for single crossings associated with set up of yarding operations or reforestation activities, equipment may be operated in the stream channel only during the use or construction of fords. During construction of or use of fords, discharge of sediment shall be avoided to the maximum extent practicable. In no case, shall the discharge result in amounts deleterious to fish.
6. Structures and associated materials that are not designed to withstand high seasonal flows shall be removed to areas above the high water mark before such flows occur.
7. If the stream channel has been altered during the operations, its low flow channel shall be returned as nearly as possible to its natural state. The shape and gradient of the streambed shall be as nearly as possible the same gradient as that which existed prior to the disturbance.

8. Any ford on a Class I watercourse shall allow unimpeded movement of adult and juvenile fish. Any temporary dam or artificial obstruction on any other watercourse necessary in the construction of a ford shall only be built from materials such as clean (screened and washed) gravel or other means that will avoid siltation.
9. All fords, including those that do not require construction, shall have approaches that are permanently rocked, paved, or otherwise armored with at least 4" of screened, washed gravel, to prevent tracking of soil into the crossing. Approaches shall be winterized (e.g., water bars or placement of erosion control materials) to prevent sediment run-off from entering the ford site.

VI. Water Drafting

All water drafting shall be conducted in accordance with the National Marine Fisheries Service (NMFS) water drafting procedures (attached hereto as Exhibit "E") in effect at the time of the water drafting.

VII. Road Construction/Reconstruction involving permanent and temporary crossings and fords

All road construction and re-construction involving permanent and temporary crossings and fords shall be conducted in accordance with the applicable measures set forth in this Exhibit "C," Sections I through V.

VIII. Storm-proofing involving permanent and temporary crossings and fords

All road storm-proofing involving permanent and temporary crossings and fords shall be conducted in accordance with the applicable measures set forth in this Exhibit "C," Sections I through V.

EXHIBIT D

Definition of Alaskan Curve

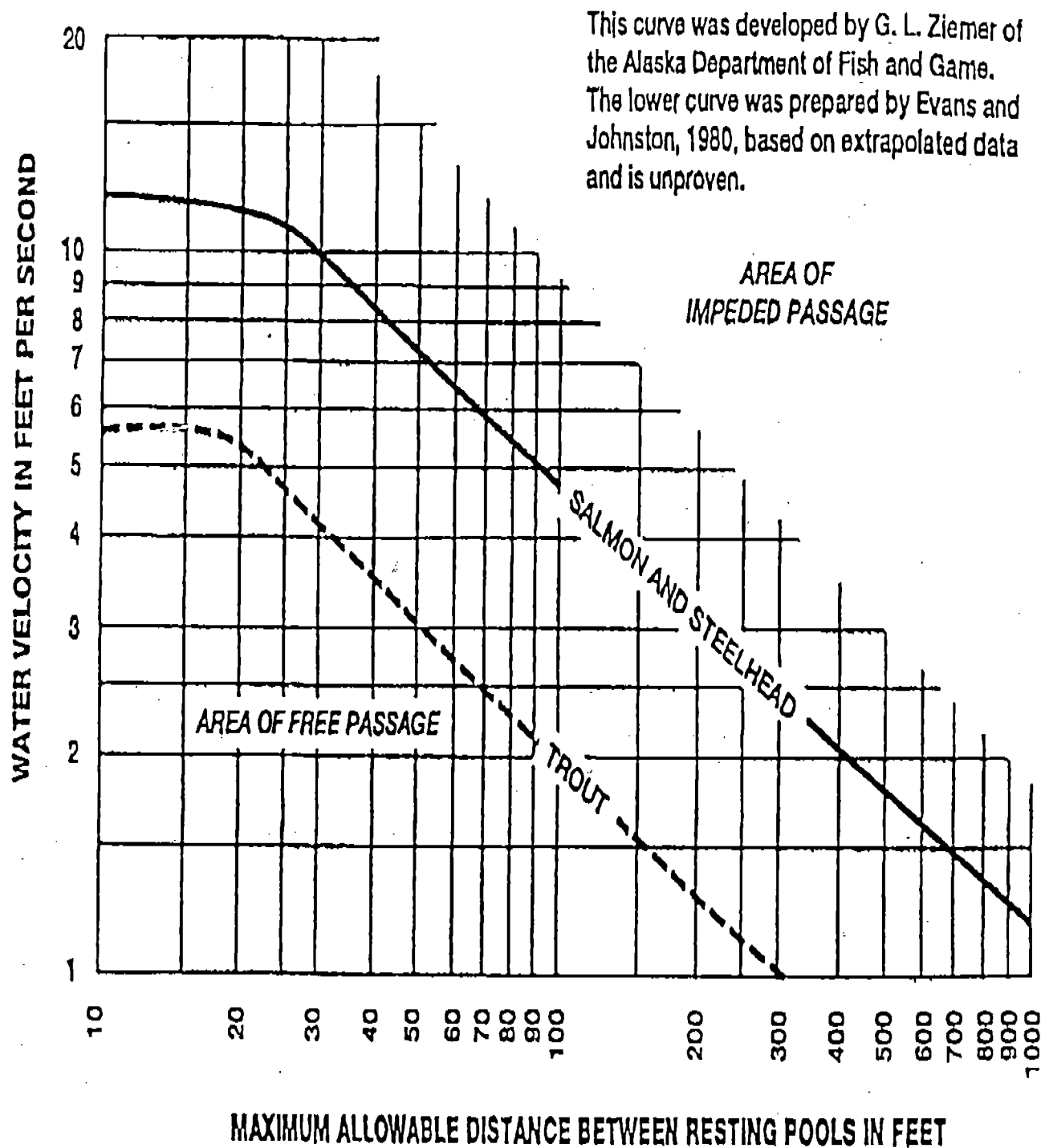


Figure 9. Swimming capability of migrating salmon (Alaska curve).

EXHIBIT E

National Marine Fisheries Service (NMFS) Water Drafting Procedures

1. The screen shall be kept in good repair and shall be used whenever water is diverted.
2. The screen face shall be parallel to the flow of the water.
3. The screen shall have an approach velocity of no more than 0.0825 feet per second. The approach velocity is the velocity of the water through the screen openings.
 - (a) The screen shall have at least 12 square feet of open area per cubic foot per second of the maximum diversion rate (12 sq. ft. of screen per 450 gal./min.).
 - (b) Round openings shall not exceed $3/32$ " in diameter.
 - (c) Square openings shall not exceed $3/32$ " measured diagonally.
 - (d) Slotted openings shall not exceed 0.0689" in width (approx. $1/16$ ")
4. The screen shall be cleaned as frequently as necessary to prevent the approach velocity from exceeding 0.33 feet per second and to prevent the head differential through the screen from exceeding 2".
5. The diversion rate shall not exceed inflow.